

JOURNAL OF INSECT BEHAVIOR—Volume 8, 1995

Journal of Insect Behavior is an international forum for the publication of peer-reviewed original research papers and critical reviews on all aspects of the behavior of insects and other terrestrial arthropods, including (but not limited to): motor patterns and orientation; quantitative ethology; social behavior; behavioral ecology; neurophysiology of behavioral responses; pharmacological probes into behavior; genetic and developmental determinants; and theoretical, mathematical, and computer models of behavioral systems. *Journal of Insect Behavior* also publishes Short Communications, which are either brief theoretical or empirical papers on insect behavior or constructive critiques of recent published papers in this field, especially those in response to papers published in the journal. Thus, *Journal of Insect Behavior* is a forum not only for original research findings, but also for the free exchange of ideas and views based on those findings.

EDITORS

William J. Bell
Department of Entomology
University of Kansas
Lawrence, Kansas

Thomas L. Payne
Ohio State University
Wooster, Ohio

EDITORIAL BOARD

Winston J. Bailey, University of Western Australia, Nedlands, Perth, Australia
Guy Beugnon, Université Paul-Sabatier, Toulouse Cédex, France
Martin C. Birch, University of Oxford, Oxford, United Kingdom
Michael D. Breed, University of Colorado, Boulder, Colorado
William H. Cade, Brock University, St. Catharines, Ontario, Canada
Hugh Dingle, University of California, Davis, California
A. F. G. Dixon, University of East Anglia, Norwich, United Kingdom
Robert W. Matthews, University of Georgia, Athens, Georgia
Therese Ann Markow, Arizona State University, Tempe, Arizona
Charles D. Michener, University of Kansas, Lawrence, Kansas
James R. Miller, Michigan State University, East Lansing, Michigan
Daniel Papaj, University of Arizona, Tucson, Arizona
Michael R. Strand, University of Wisconsin, Madison, Wisconsin
James F. A. Traniello, Boston University, Boston, Massachusetts
Yoshitaka Tsubaki, National Institute for Environmental Studies, Onogawa, Tsukuba, Japan
Louise E. M. Vet, Wageningen Agricultural University, Wageningen, The Netherlands
Thomas J. Walker, University of Florida, Gainesville, Florida
Deborah A. Waller, Old Dominion University, Norfolk, Virginia
Diana E. Wheeler, University of Arizona, Tucson, Arizona
Mark Winston, Simon Frazier University, Burnaby, British Columbia, Canada

Journal of Insect Behavior is published bimonthly by Plenum Publishing Corporation, 233 Spring Street, New York, N.Y. 10013. *Journal of Insect Behavior* is abstracted or indexed in Animal Behavior Abstracts, Automatic Subject Citation Alert, BIOSIS (Biosciences Information Service), Current Awareness in Biological Sciences, Current Awareness in Biological Sciences International, Current Contents, Entomology Abstracts, Psychological Abstracts, Psycinfo Database, and PsycLIT. © 1995 Plenum Publishing Corporation. *Journal of Insect Behavior* participates in the Copyright Clearance Center (CCC) Transactional Reporting Service. The appearance of a code line at the bottom of the first page of an article in this journal indicates the copyright owner's consent that copies of the article may be made for personal or internal use. However, this consent is given on the condition that the copier pay the flat fee of \$7.50 per copy per article (no additional per-page fees) directly to the Copyright Clearance Center, Inc., 222 Rosewood Drive, Danvers, Massachusetts 01923, for all copying not explicitly permitted by Sections 107 or 108 of the U.S. Copyright Law. The CCC is a nonprofit clearinghouse for the payment of photocopying fees by libraries and other users registered with the CCC. Therefore, this consent does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale, nor to the reprinting of figures, tables, and text excerpts. 0892-7553/95 \$7.50

Advertising inquiries should be addressed to Advertising Sales, Plenum Publishing Corporation, 233 Spring Street, New York, N.Y. 10013-1578—telephone (212) 620-8495 and fax (212) 647-1898.

Subscription inquiries and subscription orders should be addressed to the publisher at Subscription Department, Plenum Publishing Corporation, 233 Spring Street, New York, N.Y. 10013 or faxed to the Subscription Department at its number (212) 807-1047, or may be telephoned to the Subscription Department's Journal Customer Service at (212) 620-8468, -8470, -8472, or -8082. Subscription rates:

Volume 8, 1995 (6 issues) \$245.00 (outside the U.S., \$285.00). Price for individual subscribers certifying that the journal is for their personal use, \$55.00 (outside the U.S., \$64.00).
Volume 9, 1996 (6 issues) \$275.00 (outside the U.S., \$325.00). Price for individual subscribers certifying that the journal is for their personal use, \$58.00 (outside the U.S., \$68.00).

Postmaster: Send address changes to *Journal of Insect Behavior*, Plenum Publishing Corporation, 233 Spring Street, New York, N.Y. 10013.

Printed in the USA.

Journal of Insect Behavior is published bi-monthly by Plenum Publishing Corporation, 233 Spring Street, New York, N.Y. 10013. *Journal of Insect Behavior* is abstracted or indexed in Automatic Subject Citation Alert, BIOSIS (Biosciences Information Service), Current Awareness in Biological Sciences, Current Awareness in Biological Sciences International, Current Contents, Psychological Abstracts, Psycinfo Database, and PsycLIT. © 1995 Plenum Publishing Corporation. *Journal of Insect Behavior* participates in the Copyright Clearance Center (CCC) Transactional Reporting Service. The appearance of a code line at the bottom of the first page of an article in this journal indicates the copyright owner's consent that copies of the article may be made for personal or internal use. However, this consent is given on the condition that the copier pay the flat fee of \$7.50 per copy per article (no additional per-page fees) directly to the Copyright Clearance Center, Inc., 222 Rosewood Drive, Danvers, Massachusetts 01923, for all copying not explicitly permitted by Sections 107 or 108 of the U.S. Copyright Law. The CCC is a nonprofit clearinghouse for the payment of photocopying fees by libraries and other users registered with the CCC. Therefore, this consent does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale, nor to the reprinting of figures, tables, and text excerpts. 0892-7553/95 \$7.50.

Advertising inquiries should be addressed to Advertising Sales, Plenum Publishing Corporation, 233 Spring Street, New York, N.Y. 10013-1578—telephone (212) 620-8495 and fax (212) 647-1898.

Subscription inquiries and subscription orders should be addressed to the publisher at Subscription Department, Plenum Publishing Corporation, 233 Spring Street, New York, N.Y. 10013 or faxed to the Subscription Department at its number (212) 807-1047, or may be telephoned to the Subscription Department's Journal Customer Service at (212) 620-8468, -8470, -8472, or -8082.

CONTENTS

| | |
|---|-----|
| Orientation of a Hemipteran Predator to Vibrations Produced by Feeding Caterpillars | 1 |
| <i>R. S. Pfannenstiel, R. E. Hunt, and K. V. Yeargan</i> | |
| Alarm Pheromone Perception in Honey Bees Is Decreased by Smoke (Hymenoptera: Apidae) | 11 |
| <i>P. Kirk Visscher, Richard S. Vetter, and Gene E. Robinson</i> | |
| Acoustic Courtship Communication in <i>Syntomeida epilas</i> Wlk. (Lepidoptera: Arctiidae, Ctenuchinae) | 19 |
| <i>Mark V. Sanderford and William E. Conner</i> | |
| Variation in the Flash Pattern of the Firefly, <i>Photuris versicolor quadrifulgens</i> (Coleoptera: Lampyridae) | 33 |
| <i>T. G. Forrest and Micky D. Eubanks</i> | |
| Territorial Behavior of the Red Admiral, <i>Vanessa atalanta</i> (Lepidoptera: Nymphalidae) I. The Role of Climatic Factors and Early Interaction Frequency on Territorial Start Time | 47 |
| <i>Royce J. Bitzer and Kenneth C. Shaw</i> | |
| Male Mating Success and Survival in the Field with Respect to Size and Courtship Song Characters in <i>Drosophila littoralis</i> and <i>D. montana</i> (Diptera: Drosophilidae) | 67 |
| <i>Jouni Aspi and Anneli Hoikkala</i> | |
| Effect of Host Density on Offspring Sex Ratios and Behavioral Interactions Between Females in the Parasitoid Wasp <i>Nasonia vitripennis</i> (Hymenoptera: Pteromalidae) | 89 |
| <i>Bethia H. King, Mary L. Crowe, and Samuel W. Skinner</i> | |
| Effects of Nest Paper Hydrocarbons on Nest and Nestmate Recognition in Colonies in <i>Polistes metricus</i> Say | 103 |
| <i>Joy M. Layton and Karl E. Espelie</i> | |
| Can the Ant <i>Cataglyphis cursor</i> Encode Global Landmark-Landmark Relationships in Addition to Isolated Landmark-Goal Relationships? | 115 |
| <i>Isabelle Pastergue-Ruiz, Guy Beugnon, and Jean-Paul Lachaud</i> | |
| SHORT COMMUNICATION | |
| Plurimetry: New Terminology for Multiple Reproductives | 133 |
| <i>Jae C. Choe</i> | |
| In Memoriam: Vincent G. Dethier | 139 |
| <i>Frank Hanson, Louis Schoonhoven, and Ronald Prokopy</i> | |

CONTENTS

| | |
|---|-----|
| Body Size and Its Effect on Male-Male Competition in <i>Hylaeus alcyoneus</i> (Hymenoptera: Colletidae) | 149 |
| <i>John Alcock</i> | |
| Food Mixing by Generalist Grasshoppers: Plant Secondary Compounds Structure the Pattern of Feeding | 161 |
| <i>E. A. Bernays, N. Gonzalez, J. Angel and K. L. Bright</i> | |
| Male Counterstrategy Against Infanticide of the Female Giant Water Bug <i>Lethocerus deyrollei</i> (Hemiptera: Belostomatidae) | 181 |
| <i>Noritaka Ichikawa</i> | |
| The Effect of Interspecific Mating on Sex Ratios in the Twospotted Spider Mite and the Banks Grass Mite (Acarina: Tetranychidae) | 189 |
| <i>R. D. Collins and D. C. Margolies</i> | |
| Influence of Previous Mating Experience on Future Mating Success in Male <i>Lucilia cuprina</i> (Diptera: Calliphoridae) | 207 |
| <i>David F. Cook</i> | |
| Courtship Success and Multivariate Analysis of Sexual Selection on Morphometric Traits in <i>Drosophila buzzatii</i> (Diptera: Drosophilidae) | 219 |
| <i>Fabian M. Norry, Juan C. Vilardi, Juan J. Fanara and Esteban Hasson</i> | |
| <i>Drosophila</i> Do Not Skew Offspring Sex Ratio As Predicted by Trivers and Willard (Diptera: Drosophilidae) | 231 |
| <i>Russell L. Burke and Lance E. Little</i> | |
| Avoidance of Unpalatable Prey by Predaceous Diving Beetle Larvae: The Role of Hunger Level and Experience (Coleoptera: Dytiscidae) | 241 |
| <i>Kendra S. Hileman, Edmund D. Brodie, Jr. and Daniel R. Formanowicz, Jr.</i> | |
| Behavioral, Morphological, and Physiological Traits Associated with Migratory <i>Bemisia tabaci</i> (Homoptera: Aleyrodidae) | 251 |
| <i>J. L. Blackmer, D. N. Byrne and Z. Tu</i> | |

CONTENTS

| | |
|---|-----|
| The Effect of Nonnestmates on Foraging Trail Caste Ratios of <i>Nasutitermes corniger</i> (Isoptera: Termitidae) Samantha Messier | 297 |
| Foraging Behavior and Encapsulation Ability of <i>Drosophila</i> <i>melanogaster</i> Larvae: Correlated Polymorphisms? (Diptera: Drosophilidae) Alex R. Kraaijeveld and Jacques J. M. von Alphen | 305 |
| Foraging and Spatial Dispersion in Protein-Scavenging Workers of <i>Vespa germanica</i> and <i>V. maculifrons</i> (Hymenoptera: Vespidae) Byron L. Reid, John F. MacDonald, and Donald R. Ross | 315 |
| Egg-Laying Experience and Acceptance of Parasitized Hosts by the Parasitoid, <i>Leptopilina heterotoma</i> (Hymenoptera: Eucoilidae) M. L. Henneman, D. R. Papaj, A. J. Figueredo, and L. E. M. Vet | 331 |
| The Waggle Dance of the Honey Bee: Which Bees Following a Dancer Successfully Acquire the Information? Timothy M. Judd | 343 |
| Female Mate Choice and Mating Costs in the Polyandrous Butterfly <i>Pieris napi</i> (Lepidoptera: Pieridae) Arja Kaitala and Christer Wiklund | 355 |
| Agonistic Relationships Among Sympatric Mediterranean Ant Species (Hymenoptera: Formicidae) Javier Retana and Xim Cerdá | 365 |
| The Occurrence of Synchrony in the North American Firefly <i>Photinus carolinus</i> (Coleoptera: Lampyridae) Jonathan Copeland and Andrew Moiseff | 381 |
| Mechanisms of Synchrony in the North American Firefly <i>Photinus carolinus</i> (Coleoptera: Lampyridae) Andrew Moiseff and Jonathan Copeland | 395 |
| SHORT COMMUNICATION | |
| Perseveration in the Color Choices of Honeybees T. Ohyama, P. A. Couvillon, and M. E. Bitterman | 409 |

| | |
|---|-----|
| Female Mating Behavior in the Field Cricket, <i>Gryllus pennsylvanicus</i> (Orthoptera: Gryllidae), at Different Operational Sex Ratios | 269 |
| <i>Konstantine Souroukis and Anne-Marie Murray</i> | |
| SHORT COMMUNICATIONS | |
| Frequency Discrimination in the Hearing of Honey Bees (Hymenoptera: Apidae) | 281 |
| <i>William F. Towne</i> | |
| Female Acoustic Response in <i>Drosophila mettleri</i> (Diptera: Drosophilidae): A New Recording Technique to Detect Female Sounds | 287 |
| <i>Henar Alonso-Pimentel and Hayward G. Spangler</i> | |
| Book Review: The Encyclopedia of Land Invertebrate Behaviour | 295 |
| <i>Darrin S. Good</i> | |

CONTENTS

- Collective Control Without Explicit Coding: The Case of Communal Nest Excavation 417
J. L. Deneubourg and N. R. Franks
- Venom Spraying in *Parachartergus colobopterus*: A Novel Defensive Behavior in a Social Wasp (Hymenoptera: Vespidae) 433
Robert L. Jeanne and Malcolm G. Keeping
- Usurpations and Late Associations in the Solitary Founding Social Wasp, *Polistes biglumis bimaculatus* (Hymenoptera: Vespidae) 443
M. C. Lorenzi and R. Cervo
- Mating Tactics and Courtship Behavior in *Cleogonus rubetra* (Fabricius) (Coleoptera: Curculionidae) 453
Michal Polak and William D. Brown
- Effect of a Vertical Object on the Sex Pheromone-Mediated Flight and Landing Behaviors of the Male Lightbrown Apple Moth, *Epiphyas postvittana* (Walker) (Lepidoptera: Tortricidae) 465
S. P. Foster and R. H. Ayers
- The Parasitoid *Cotesia glomerata* (Hymenoptera: Braconidae) Discriminates Between First and Fifth Larval Instars of Its Host *Pieris brassicae*, on the Basis of Contact Cues from Frass, Silk, and Herbivore-Damaged Leaf Tissue 485
Letizia Mattiacci and Marcel Dicke
- Host Influence on Mating Behavior and Spermatophore Reception Correlated with Reproductive Output and Longevity of Female *Earias insulana* (Boisduval) (Lepidoptera: Noctuidae) 499
Ashok J. Tamhankar
- Female Preference for Large Males in the Bushcricket *Requena* sp. 5 (Orthoptera: Tettigoniidae) 513
Nina Wedell and Tove Sandberg
- Size and Mating Success in Males of the Western Harvester Ant, *Pogonomyrmex occidentalis* (Hymenoptera: Formicidae) 523
Diane C. Wiernasz, Julie Yencharis, and Blaine J. Cole

| | |
|---|-----|
| Behavioral Adaptations of Two Phytophagous Insects Feeding on Two Species of Phototoxic Asteraceae | 533 |
| <i>Gabriel Guillet, Marie-Ève Lavigne, Bernard J. R. Philogène, and J. Thor Arnason</i> | |

| | |
|--|-----|
| Changes in the Behavior of the Female Short-Tailed Cricket, <i>Anurogryllus muticus</i> (De Geer) (Orthoptera: Gryllidae) Following Mating | 547 |
| <i>H.-J. Lee and W. Loher</i> | |

CONTENTS

- Variation in Dietary Patterns Among and Within Polyphagous
Grasshopper Species (Orthoptera: Acrididae) 563
Jerome J. Howard
- The Effect of Plant Chemistry on the Acceptability of Caterpillar
Prey to the Argentine Ant *Iridomyrmex humilis*
(Hymenoptera: Formicidae) 579
M. L. Cornelius and E. A. Bernays
- Behavioral Reproductive Isolation in *Drosophila silvestris*, *D.*
heteroneura, and Their F₁ Hybrids (Diptera:
Drosophilidae) 595
Donald K. Price and Christine R. B. Boake
- Onion Fly, *Delia antiqua*, Oviposition and Mating as Influenced by
Insect Age and Dosage of Male Reproductive Tract
Extract (Diptera: Anthomyiidae) 617
*Joseph L. Spencer, Marco P. Candolfi, James E. Keller, and
James R. Miller*
- Selection on a Haploid Genotype for Discrimination Learning
Performance: Correlation Between Drone Honey Bees
(*Apis mellifera*) and Their Worker Progeny
(Hymenoptera: Apidae) 637
Shirly T. Benatar, Susan Cobey, and Brian H. Smith
- Behavioral and Morphological Adaptations of the Coccinellid
Platynaspis luteorubra for Exploiting Ant-Attended
Resources (Coleoptera: Coccinellidae) 653
Wolfgang Völkl
- Comparison of Oviposition Behavior of a Solitary and Gregarious
Parasitoid (Hymenoptera: Mymaridae) 671
J. van Baaren, J.-P. Nènon, and G. Boivin
- Interplant Movement by Pear Psylla (Homoptera: Psyllidae): Effects
of Sex Ratio and Reproductive Status 687
David R. Horton and Tamera M. Lewis
- The Relationship Between Mating and Oogenesis and Monarch
Butterflies (Lepidoptera: Danainae) 701
Karen S. Oberhauser and Rachel Hampton

SHORT COMMUNICATIONS

- Variable Load Size–Ant Size Matching in Leaf-Cutting Ants, *Atta colombica* (Hymenoptera: Formicidae) 715
Martin Burd
- Sibmating and its Fitness Consequences in the Parasitoid Wasp *Spalangia cameroni* (Hymenoptera: Pteromalidae) 723
B. H. King and R. B. King
- Book Review: Nourishment and Evolution in Insect Societies 731
Bernard J. Crespi
- Book Review: The Coevolutionary Process 735
Thomas G. Whitham
-

CONTENTS

- The Role of Physical Cues in the Regulation of Host Recognition and Acceptance Behavior of *Aphidius ervi* Haliday (Hymenoptera: Braconidae) 739
Donatella Battaglia, Francesco Pennacchio, Antonio Romano, and Antonio Tranfaglia
- Influence of Two Successive Learning Processes on the Response of *Eupelmus vuilleti* Crw (Hymenoptera: Eupelmidae) to Volatile Stimuli from Hosts and Host Plants 751
A. M. Cortesero, J. P. Monge, and J. Huignard
- How Locusts Separate Pattern Flow into Its Rotatory and Translatory Components (Orthoptera: Acrididae) 763
R. Preiss and P. Spork
- Effect of Male and Female Age on the Mating Success of the Obliquebanded Leafroller *Choristoneura rosaceana* (Lepidoptera: Tortricidae) Under Different Ecological Conditions 781
Johanne Delisle
- Oral Exudate as a Mediator of Behavior in Larval Eastern and Western Spruce Budworms (Lepidoptera: Tortricidae) 801
L. M. Poirier and J. H. Borden
- Reproductive Biology and Function of Multiple Mating in the Mating System of a Tree Cricket, *Truljalia hibinonis* (Orthoptera: Podoscirtinae) 813
Tomohiro Ono, Fusako Hayakawa, Yumi Matsuura, Masako Shiraishi, Hikari Yasui, Tami Nakamura, and Mieko Arakawa
- Genetic Studies of a Behavioral Mutant, Glucose Aversion, in the German Cockroach (Dictyoptera: Blattellidae) 825
Mary H. Ross and Jules Silverman
- Decline in Photopositive Tendencies with Age in *Drosophila melanogaster* (Diptera: Drosophilidae) 835
E. Le Bourg and J. Badia

SHORT COMMUNICATIONS

Escape Behavior of Host *Leucania separata* (Lepidoptera: Noctuidae)

Larvae from the Cocoon Mass of the Parasitoid

Apanteles kariyai (Hymenoptera: Braconidae)

847

Toshiaki Shimizu and Mitsutaka Sakakibara

A Highly Specialized Social Grooming Honey Bee (Hymenoptera:

Apidae)

855

Darrell Moore, Jennifer E. Angel, Iain M. Cheeseman,

Gene E. Robinson, and Susan E. Fahrbach

AUTHOR INDEX

863

SUBJECT INDEX

865
